

Dynamic Power Transducer for improved motor diagnostics

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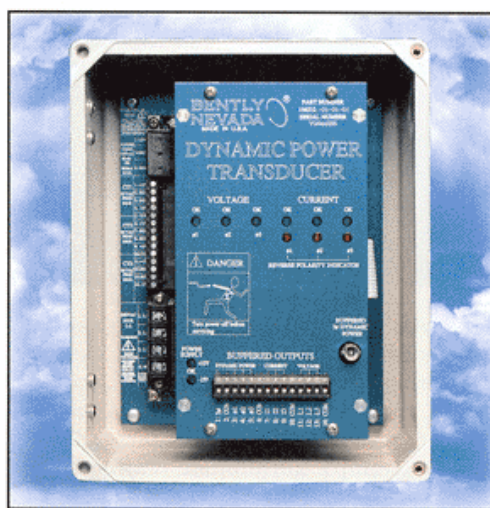
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The use of electricity as a power source for industrial equipment continues to increase. There are many contributing factors: increased plant automation, deregulation of the power industry, gas turbine generation developments, the use of more electric motors, and the use of Variable Frequency Drives with electric motors for better process control. Also, the use of steam as a backup system in case of an electrical power outage is decreasing.

The trend is for plants to increase electrical generating capacity and to improve distribution system reliability as they use more electric motors to drive machinery. Since the plant processes rely more and more on electric motors, an effective way of protecting those machines is needed.

Instantaneous power measurement

Bently Nevada has developed a powerful diagnostic tool to allow a more detailed diagnosis of your motor and better use of dynamic power information. The Dynamic Power Transducer (DPT) measures the instantaneous power used by a motor or produced by a generator. The DPT is unique because, along



with the instantaneous power output, it also provides instantaneous current and voltage outputs, which help the user separate line problems from load problems. Instantaneous power, which includes static (average) and dynamic power components, can be used to detect short power spikes which could indicate an impending machine failure. Traditional wattmeters only provide average power readings and are, therefore, incapable of registering these short power spikes.

The static (dc) component of the instantaneous single or three-phase power signal is:

- The quantity calculated or read by the majority of power instrumentation
- Linearly proportional to the average power delivered by a generator or consumed by a motor

- Useful for trending overall power generation and usage
- A way to indicate direction of average power flow by signal polarity

The dynamic component of the three-phase power signal helps identify malfunctions including:

- Unbalanced phase line voltage
- Unbalanced phase current
- Electromagnetic rotor and stator anomalies
- Rapid process changes
- Destructive power line or motor-generated harmonics
- Loss of one or more power line phases

When a TorXimitor® signal is available, the three-phase dynamic power signal can be used to estimate the electrical and mechanical efficiency of the motor or generator.

The Dynamic Power Transducer provides the following features:

- Can be installed on any AC motor or generator. The DPT will typically be installed in the motor control room away from the motor itself.
- Compatible with 3- and 4-wire Delta or Wye systems.
- Provides buffered instantaneous outputs. These outputs can be interfaced to the 3300 and 3500 Monitoring Systems, and ADRE® for Windows.

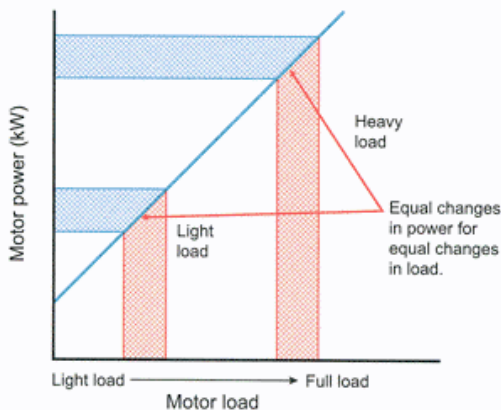


Figure 1.

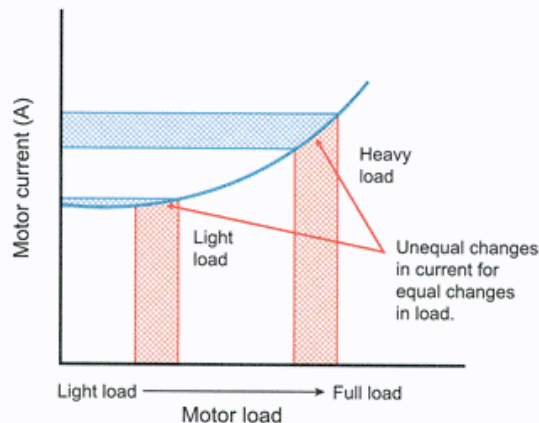


Figure 2.

- Can be permanently installed, avoiding repeated contact with high voltages.
- Compatible with Variable Frequency Drive electric motors.
- Doesn't require Potential Transformers if the three-phase system voltage is less than 600 Vrms.
- Uses LEDs to indicate the status of the input voltages and currents.

Why monitor power instead of current?

Power is linearly related to load. Changes in power directly reflect changes in the load (Figure 1).

Power is more sensitive. At lighter loads, power can be 10 times more sensitive than current to load changes because the power factor is embedded in the power measurement. At no load, the power factor can be as low as 0.1, and at full load it can be as high as 0.9 (Figure 2).

DPT Inputs

The DPT has three sets of inputs (Figure 3):

- Local power: 110 or 220 Vac
- Three-phase line voltages
- Three voltage-mode, current signals from current transducers, such as Hall-effect current sensors

and shunted current transformers.

DPT Outputs

The DPT provides buffered instantaneous output signals proportional to:

- Three-phase power, static and dynamic
- Single phase power, static and dynamic
- Voltages
- Currents

Our focus on providing valuable measurement tools enables you to

identify developing problems early, to minimize costly repairs, and to eliminate the fundamental problems rather than to treat the symptoms. From problematic electrical disturbances to mechanical malfunctions, monitoring dynamic power, and its parameters, provides a new way to understand the condition of your machinery and processes. Using The DPT, you will be able to increase plant profitability through improved asset management and reliability. Contact your nearest Bently Nevada sales representative for more information. ■

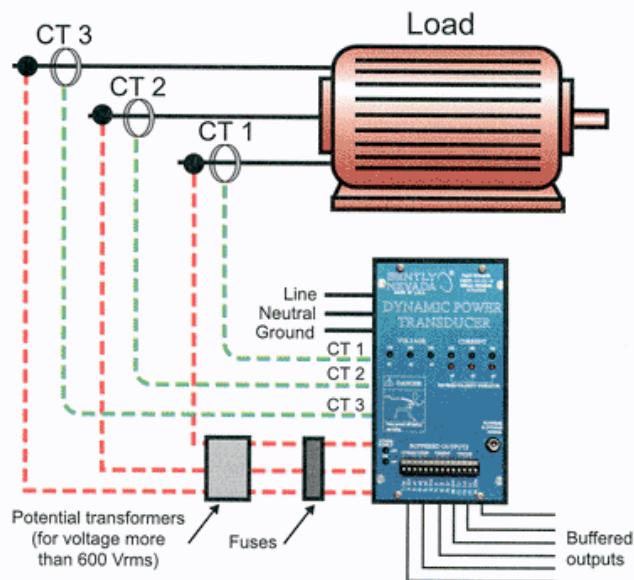


Figure 3